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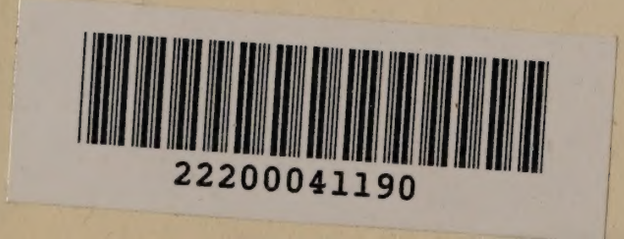
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THE JOURNAL OF Tropical Medicine and Hygiene

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SIR RONALD ROSS, K.C.B., K.C.M.G., F.R.S., Colonel A.M.S., *Honorary Adviser to the Editorial Staff.*

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been confirmed (Brahmachari, Megaw, Knowles, Acton and others).

Very rarely similar skin lesions due to *Leishmania donovani* infection may be found developing in an incompletely cured case of kala-azar in which the skin lesions more or less persist after sterilization of the internal organs against leishmania by a course of antimonial treatment.

The following is one such extremely rare case and is therefore of exceptional interest.

Patient, G. A., Mahommedan, was at first treated for kala-azar by a course of treatment with sodium antimonyl tartrate. Six months later, he was admitted into hospital with nodular eruptions over the body. He stayed in hospital for nearly three weeks, during which time he was treated with five injections of von Heydon's 471 (stibosan) without any improvement. He was also treated with galvanic current exposures in the Calcutta School of Tropical Medicine without any benefit. Patient came under our observation July 23, 1926, about six months after he had left off treatment.

Condition at the time of our first observation.—Patient had very well-marked nodular eruptions over his face, trunk and extremities. Besides these there were patches of a pigmentation over the body, especially the trunk. He was suffering from fever with enlargement of the spleen.

Blood examination on July 28, 1926, before treatment with urea stibamine (Brahmachari), was as follows:—

Red blood-cells	4,000,000	Leucocyte count:	
White blood-cells	2,700	Polymorphonuclears	61%
Hæmoglobin ...	75%	Mononuclears ...	18%
		Lymphocytes ...	17%
		Eosinophiles ...	4%

No malarial parasites. Culture from the peripheral blood on Kliggler's media gave positive flagellate culture. Wassermann reaction, negative. The nodules in the skin showed *Leishmania donovani* on smear and culture.

Patient received a course of treatment with urea stibamine (Brahmachari) from August 15, 1926. The spleen quickly diminished in size and the fever stopped. The skin eruptions seemed to be very resistant to treatment, though they slowly diminished on the trunk and extremities after a course of treatment of bi-weekly intravenous injections of urea stibamine extending over a period of five months.

Blood examination on September 13, 1926, after treatment with urea stibamine (Brahmachari):—

Red blood-cells	4,500,000	Leucocyte count:	
White blood-cells	6,600	Polymorphonuclears	71%
Hæmoglobin ...	75%	Mononuclears ...	8%
		Lymphocytes ...	19%
		Eosinophiles ...	2%

Blood-culture for flagellates, negative.

Observations.

The present case is of exceptional interest for the following reasons:—

(1) The patient developed dermal leishmanoid at a stage when he was not completely cured of kala-azar, as shown by the positive flagellate culture from the peripheral blood, leucopænia with fever and enlargement of the spleen. Though positive flagellate culture from the peripheral blood could be due to the blood having been accidentally infected from the skin at the time of drawing the blood, yet the clinical picture of the case, at the time when it came under our observation, shows that the patient was not cured of kala-azar.

(2) He was subsequently cured of kala-azar after a course of treatment with urea stibamine (Brahmachari).

(3) The skin eruptions were very resistant to treatment with antimony, as they seemed to be only very slowly yielding to treatment with urea stibamine.

(4) The case appears to have been one of incompletely cured kala-azar at the time of our first observation, and was met with at a stage when visceral leishmaniasis was passing into dermal leishmanoid. It is therefore the first of its kind, as up to now all cases of dermal leishmanoid that have been recorded were found to have developed in kala-azar patients after a definite period of recovery from visceral leishmaniasis.

The Use of Ephedrine in Spinal Anæsthesia (N. F. Ockerblad and T. G. Dillon, *Journ. Amer. Med. Assoc.*, April 9, 1927).—Ephedrine has proved of immense practical use in spinal anæsthesia. Although in fully 90 per cent. of the spinal anæsthesia patients there is a dangerous drop in both the systolic and the diastolic blood-pressure, the judicious use of ephedrine successfully restores the right amount of arterial tension necessary for well-being.

Morphological Notes together with some Ultrafiltration Experiments on the Crown-Gall Pathogene, Bacterium tumefaciens (H. R. Rosen, *Mycologica*, No. 5, September-October, 1926).—By means of a special method of staining, developed by the writer, the following observations on *Bacterium tumefaciens* are made. First, a very marked variation in size in young cultures. Second, the presence of many club-shaped rods in young cultures which appear heavily stained and homogeneous by ordinary staining methods and which are found to consist of plump rods with extensions or buds from one end, by the special staining method. Third, the presence of heavily staining, bipolar bodies in ordinary rods. Evidence is presented to show that these rods are not spores and that no spores are to be expected in this organism. Fourth, a central body found in rods possessing one polar body, the central body being in the form of a band or of two particles opposite each other, suggesting a mitotic figure. Other evidence is presented indicating a nuclear phenomenon prior to cell division.

Using a Berkefeld V filter in preliminary experiments, the filtrate is found to contain small rods, which when transferred give rise to characteristic

growths of *B. tumefaciens*. Checked with a culture of *B. amylovorus*, a small rod former but possessing no tiny buds or minute rods, the filtrate remained sterile. Attention is called to the bud-like processes described by Barnard as occurring in the virus of various tumours and comparison is made with this and the bud-like extension on rods of *B. tumefaciens*.

Ætiology of Oroya Fever. Viability of Bartonella bacilliformis in Cultures and in the Preserved Blood and an Excised Nodule of Macacus rhesus (H. Noguchi, *Journ. of Exper. Med.*, October 1, 1926).—Fifteen specimens of citrated blood from seven monkeys infected with *Bartonella bacilliformis* were kept at 40° C. for periods of twenty-four to one hundred and fifty-two days, and at the end of each period were tested for viability by the cultural method. All yielded cultures, although there was a considerable reduction in the number of living organisms, as shown by titration. Two specimens of citrated blood from infected monkeys, which had been kept for forty-five days at room temperature, yielded growth when a drop of each was inoculated into leptospira medium; while after sixty-seven days at the same temperature, 0·1 c.c. of a 1:10,000,000 dilution of each specimen was sufficient to yield growth. Since the original titre of the blood has been only 1:10, it is evident that *B. bacilliformis* had multiplied considerably under the conditions. Smears of the specimens showed clumps of organisms among the corpuscles but no trace of intracorpuscular multiplication. *B. bacilliformis* survived in the excised nodule from a monkey for at least fifty-six days at 45° C., and for twenty-eight days at room temperature, when a piece of the tissue was covered with citrate-saline solution or ground up in it. The death of *B. bacilliformis* at room temperature under these conditions may be due to the effect of autolysis of the tissue or to a lack of nutrient substances. The suspension alone is not a suitable culture medium, but a trace of hæmoglobin and about 10 per cent. of fresh horse or rabbit serum make it a favourable one. The viability of *B. bacilliformis* was tested in cultures kept at 25°, 37° and 40° C. for varying periods. At 25° C. cultures on leptospira medium remained transferable after one hundred and twenty days, and when placed in the refrigerator at the time of maximum growth (after twenty-eight days at 25° C.) they were still viable at the end of four months. The viability of cultures on blood-agar slants depends to a considerable extent upon the care with which the surface of the medium is protected from drying. Under favourable conditions, and at 25° C., the organisms remain motile for about two weeks and transferable for a month or longer. Cultures on either of these media die out after fifty days at 37° C. The data presented suggest that it may be fruitful to make a study by cultural methods of pathological material brought from distant parts of the world, even when many days or weeks have elapsed since it was procured.

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THE JOURNAL OF

Tropical Medicine and Hygiene

JUNE 15, 1927.

THE RONALD ROSS GATE OF COMMEMORATION.[1]

AN exceedingly interesting ceremony took place in Calcutta on Friday, June 7, 1927, when His Excellency Lord Lytton, Governor of Bengal, unveiled a commemorative gate in honour of Sir Ronald Ross near his old laboratory in the Presidency General Hospital. The memorial is in the form of a gateway bearing a bronze medallion of Sir Ronald in the centre above the arch; whilst on the left is an inscription to the effect that in the small laboratory seventy yards to the south-east of the gateway Sir Ronald Ross made his ever-memorable discovery of the mosquito transmission of malaria, and to the right of the medallion is a

[1] Reprinted from *The Indian Medical Gazette*, vol. lxii, No. 3, March, 1927.

quotation from a poem which he wrote when he first found that the malarial parasite underwent development in a mosquito. We give below a photograph of the memorial, also a photograph of the medallion, for which Sir Ronald gave special sittings in London last year. There was a large gathering of the leading citizens of Calcutta.

In asking His Excellency to unveil the memorial, Lieut.-Colonel J. W. D. Megaw, C.I.E., V.H.S., I.M.S., spoke as follows:—

"Your Excellencies, ladies and gentlemen,—It is astonishing that so few of the inhabitants of Calcutta know of the existence of the little laboratory a few yards from this spot in which Sir Ronald Ross made one of the greatest discoveries in the history of the world. In the hot weather months of 1898 Surgeon Major Ronald Ross, I.M.S., found out how malaria is conveyed by the mosquito.

"This discovery has been exploited to some extent; it has led to the saving of many thousands of lives, and to the reclamation of large tracts of country which would otherwise have been uninhabitable, but though twenty-eight years have elapsed since it was made, we are only beginning to scratch the surface of the vast mine of wealth which it has placed in our possession.

"If Sir Ronald's discovery were fully applied it would add millions of healthy human beings to the population of the earth, it would bring health and prosperity to many millions who now exist in poverty and ill-health. There is no other discovery for which such claims can justly be made.

"About ten years before he made his great discovery Ross wrote the following lines, which breathe a prophecy and a prayer:—

'In this, O Nature, yield I pray, to me.
I pace and pace, and think and think, and take
The fevered hands and note down all I see,
That some dim distant light may haply break.
The painful faces ask—"Can we not cure?"
We answer "No, not yet; we seek the laws."
O God! reveal through all this thing obscure
The unseen, small, but million-murdering cause.'

"The answer to the prayer came after years of toil, but even before he had completed his discovery his confidence of victory was expressed in the lines which are now inscribed on the gate of commemoration which Your Excellency is about to unveil.

'This day relenting God
Hath placed within my hand
A wondrous thing, and God
Be praised, at His command,
Seeking His secret deeds
With tears and toiling breath
I find thy cunning seeds,
O million-murdering Death!
I know this little thing
A myriad men will save.
O death! where is thy sting,
Thy victory, O Grave?"

"'A prophet is not without honour save in his own country.' Sir Ronald's offence did not consist merely in being a prophet, he added to it by being a poet and a scientist, and so he trebly earned the indifference with which his great work was received in India.

"Sir Ronald, not unnaturally, has often complained of the apathy and even opposition which he encountered. I have sometimes thought that the obstacles which were placed in his path may have been blessings in disguise.

"There are few men of genius, like Sir Ronald Ross and Sir Leonard Rogers, to whom obstacles are but stepping stones by which they climb to still greater heights of achievement.

"If Sir Ronald had lived in times like the present under the benevolent rule of Your Excellency, he would have had no cause to complain of lack of encouragement or recognition; but would he have accomplished so much if he had been the pampered protégé instead of the grim and misunderstood worker, who had to fight for every opportunity to carry on his research? Certainly he could hardly have done more. He not only discovered how malaria is conveyed, he showed how the disease can be controlled. He himself at first was the only one who had the clearness of vision to see the vast results which would follow from his work. He was sadly mistaken when he imagined that the world would at once perceive the value of the great gift which he had placed at its disposal. The men of science might have been expected to realize the great possibilities of his discovery, but even they were unable to make the forward intellectual stride which was needed if they were to form a true estimate of its value.

"Ross was years ahead of his times; in those days the suggestion that disease could be controlled by suppressing mosquitoes provoked a sarcastic smile and the author of the proposal was regarded as an enthusiastic visionary. This indeed he was, but not in the vulgar sense; his vision was clear and his enthusiasm justified. It was the people of the time whose eyes had not yet been opened.

"The completeness of his discovery was remarkable. If we knew nothing about malaria except what Ross found out we should still be able to control the disease. If our knowledge consisted of what others discovered independently of the work of Ross we should know but little of the means of preventing malaria.

"It is therefore not surprising that we should be so eager to mark the birthplace of his discovery. What is surprising is that after so many years it should be left to us to have the privilege of doing so.

"The gate of commemoration which Your Excellency is about to unveil, though small in size and insignificant in appearance, will form a landmark in the history of civilization."

In unveiling the memorial, His Excellency Lord Lytton made the following speech:—

"Ladies and gentlemen,—Colonel Megaw is quite right in saying that the ceremony which you have asked me to perform to-day is one that gives me unusual pleasure. We are commemorating an event from which every class in the community has already

derived benefit and may yet derive even greater benefits in the years to come. We are honouring a man whom every Englishman and every Indian without distinction of creed or party is glad to honour. Seldom indeed has it fallen to my lot in the last five years to find myself the spokesman of such a completely unanimous opinion. There is not a man or woman in the whole of India who would grudge Sir Ronald Ross the highest measure of praise and gratitude which can be expressed in words.

"His achievement, I think, is even greater than Colonel Megaw has described it, and I do not think anyone will accuse me of exaggeration if I say that Sir Ronald Ross's discovery has been the greatest contribution to medical knowledge since the days of Pasteur. So familiar are we now with the connection between malaria and the mosquito that it is difficult for us to realize how startling was the first announcement of this fact, nor how sceptical was the generation to which it was first made. Yet this knowledge, on which so much depends, we owe not to any accident but entirely to the patient, thorough and successful research of one man—the man whom we have met to honour.

"The consequences of this discovery, which seems to us so simple, so obvious, have had, as Colonel Megaw has reminded us, the most far-reaching results. Not only has it revealed the cause of malaria, improved the treatment of the disease, helped towards its prevention and indicated the steps by which it may one day be eradicated, but it has also led to research along similar lines into the causes and treatment of other malignant epidemic diseases. Indeed, the whole of that magnificent and valuable institution of research of which Colonel Megaw is now himself the distinguished principal may be truly said to owe its very existence to the work of Sir Ronald Ross.

"Reading through the *Memoirs* of Sir Ronald's life, one is struck by his versatility, his high idealism and his perseverance in the face of difficulties and obstruction; and it is such qualities as these that have made him one of the world's greatest benefactors. There is also another side of his personality which deserves to be mentioned. I was once told that the historian Lecky, whose friends would never have suspected him of harbouring military ambitions, once confessed to a friend that the great regret of his life was that his parents had not made him a soldier, and he has left on record a poem in which this strange regret is half revealed:—

> 'Not every thought can find its words,
> Not all within is known;
> For minds and hearts have many chords
> That never yield their tone.
> Tastes, instincts, feelings, passions, powers,
> Sleep there unfelt, unseen;
> And other lives lie hid in ours,
> The lives that might have been.'

"I half suspect from the lines which Colonel Megaw has quoted, and some of which are reproduced upon the Gate of Commemoration which I shall presently unveil, that Sir Ronald Ross, too, is conscious of a 'life that might have been' and would perhaps rather be honoured as a poet than as a man of science. If so, this only reveals to us the breadth of his human sympathy, and adds to the measure of our appreciation of him. His self-imposed mission was to rid India of the scourge of fever from which it suffered, and he worked incessantly, ungrudgingly, in spite of disappointment and difficulties which might well have deterred other men from their purpose, until after four years of unremitting toil he succeeded in finding the secret. Not content with disclosing the secret for the benefit of mankind, he completed his task by laying down detailed plans for the control of the disease.

Four years after he made his discovery Sir Ronald Ross had an opportunity of making his first great demonstration of its vast possibilities by freeing Ismailia of malaria at a time when the evacuation of the town was being seriously contemplated. He therefore showed by their practical application the immense value of the principles which he had established. So comprehensive were the plans he laid down that it was on their basis that all the great successful experiments in freeing the Panama Canal zone and other areas were subsequently carried out. It is nothing short of miraculous that such results should have been obtained by the discovery of one man and that he, almost unaided, should have been able to detect not only the means by which malaria is carried, but also the means by which it can be prevented.

"Another fact which we are commemorating to-day, and which we in Calcutta are proud to remember, is the fact that this momentous discovery was made in this city in a small laboratory a few yards from this spot. That nearly thirty years should have passed without any recognition by Calcutta of Sir Ronald Ross's services to humanity is a reproach to this city, which I am glad to say is now at last going to be removed. It is customary to erect monuments and commemorative tablets to mark the sites where men have died or are buried, but so far as I know there are few such monuments to mark the place where knowledge has been born. Yet what could be a happier subject for commemoration than the birthplace of knowledge? We are all proud that Calcutta should have this distinction, but unfortunately other parts of the world have as yet derived more benefit from Sir Ronald Ross's discovery than the province which gave it birth. Panama, Ismailia and West Africa owe their freedom from fever to his work. The Malay Peninsula, he tells me, is making good use of it. Bengal in thirty years has profited but little by it and is still a victim to the ravages of this disease. That is another reproach which after to-day's ceremony I hope we shall do something to remove.

"There are two agencies in this province that are concentrating the best available experience upon a war against disease. They are the School of

Tropical Medicine and the Co-Operative Anti-Malarial Societies—the one an official and the other unofficial organizations. The best memorial we could erect to Sir Ronald Ross, the best use we could make of his discovery for the benefit of Bengal would be to raise a large endowment fund for the support of these two organizations. The School of Tropical Medicine is carrying on Sir Ronald Ross's work, is adding every year to our knowledge of the causes of diseases and the methods necessary for their prevention. They are the Intelligence Department of the Army of Health. The Co-Operative Health Societies are the field force, the are carrying the knowledge obtained by the School of Tropical Medicine into the homes of the people and enlisting their co-operation in preventive measures. Funds are urgently needed for the support of each, and I hope that as a result of this meeting a movement will be set on foot to raise a fund associated with Sir Ronald Ross's name to develop the work which these organizations are doing, and to carry it into every village in Bengal.

"Sir Ronald's discovery has been worth many millions of pounds to the human race, apart altogether from the saving of life and the prevention of sickness. By the application of the principles which he laid down we can save many more lives and money for Bengal, we can restore the vitality of the province and enable her to take a more prominent and valuable place in the work of the Empire."

Sir Ronald Ross, who was obviously deeply moved with emotion, then made a brief speech which was in his happiest vein. He spoke as follows:—

"Your Excellency, ladies and gentlemen,—I trust that you will excuse me if my remarks are but brief. There are some moments in a man's lifetime when he is so overcome with emotion that he can hardly speak, and this is such a moment to me. I can only say that it is the proudest moment of my life. It is but rarely that men of science receive such recognition during their lifetime. I feel that I ought to be dead; but there is a good deal of life in me still.

"If I may, Sir, I would like to recall the names of a few of the many who were associated with me in research work in malaria. I would refer to Dr. Alphonse Laveran, my master, who discovered the parasite of malaria, a man whose genius was typical of the great nation from which he sprang. I would refer to Sir Patrick Manson, from first to last my sponsor, and the man who put me on to the right trail. I would refer to Surgeon-General Harvey, at that time Director-General, Indian Medical Service. It is true that during these years of work I complained constantly and continuously. But what is the use of being a great man if one is not allowed to 'grouse'? My grievances were genuine. It is true that my work was subject to constant interruptions. Surgeon-General Harvey could not help that, he could not prevent it, but he did his utmost to mitigate the circumstances, at every step he showed his interest and did all that he could to further my work. I would also like to refer to the subsequent work of many workers in India, including such men as Christophers, James and Bentley.

"Discovery is always progressive and I should like to refer to the many workers who have added to our knowledge of malaria, many of them worked in India, their names are well known. I should like to mention a little incident that happened while I was working in my little laboratory. The late Colonel Maynard always took a keen interest in my work. I well remember the morning when I first came across the oöcysts of the parasite of bird malaria in mosquitoes. I rushed out of the laboratory and came across him about a hundred yards from the hospital. I said to him 'I have got them again.' He looked greatly astonished and evidently suspected me of having got something quite different from oöcysts, but when he came to the conclusion that I was still in my sober senses —though he was probably sceptical as to the importance of the insignificant little objects which I showed him—he came across to see them.

"I would like to refer to my bearer, Lachman. He is here to-day, standing in the corner of the tent. He was a faithful and a valuable servant and one who did much to help me in the laboratory. I would like to refer to my laboratory assistant, Mahomed Bux. He is dead now, poor fellow; he was for many years in the laboratory here after I left and he died here. He had only one failing, a fondness for smoking Indian hemp. At nights, after he had had his pipe, his last conscious action before he fell down stuporous would be to chase away marauding cats from the mosquito nets within which were my birds and my mosquitoes.

"Revisiting the scene of my work, Sir, after a lapse of twenty-eight years, I see very great changes. My old laboratory used to have black, soot-stained walls. It is now red. The hospital used to seem much closer to the laboratory than it now is. There was a simply magnificent ditch just outside the laboratory. I had only to step out of the laboratory and dip a pail into it to obtain a rich supply of various kinds of mosquito larvæ. They have gone and filled in that ditch. The place seems changed, somehow, and I much regret the disappearance of my valuable old ditch.

"In conclusion, Your Excellency, I can only repeat that I am very conscious of the great honour which you and the citizens of Calcutta city have done me by erecting this memorial to my work."

After Sir Ronald's speech, His Excellency left the *shamiana* erected for the ceremony, crossed the road, and unveiled the memorial. He then opened the commemorative gateway and was conducted by Sir Ronald Ross to the laboratory in which the great discovery was made.

The commemorative gateway faces on Lower Circular Road in front of the Presidency General Hospital, Calcutta; and it will be in full view of the thousands who pass along that road daily.

On Monday, January 10, Sir Ronald delivered a lecture on malaria to a large audience at the Empire Theatre, Calcutta, under the presidency

of His Excellency the Governor of Bengal. Sir Ronald told the story of his discovery to a deeply interested gathering. He referred to the recently established Ross Institute in London and thanked the many subscribers from India who had helped in promoting the cause of the Institute.

Annotations.

A Comparative Study of Ephedrine, Pseudo-Ephedrine and B-Phenyl-Ethylamine. With Reference to their Effects on the Pupil and on the Blood-Pressure (K. K. Chen, *Arch. Int. Med.*, March 15, 1927).—B-phenyl-ethylamine hydrochloride when applied locally to rabbits' and cats' eyes does not dilate the pupils. B-phenyl-ethylamine hydrochloride when injected intravenously into dogs in small doses (0·5 to 2·7 mg. per kg.) raises arterial blood-pressure. The rise is more intense but less persistent than that seen after the injection of ephedrine. When given by mouth in man, it does not exhibit its pressor action. Pseudo-ephedrine hydrochloride dilates the pupils of man when applied locally, raises arterial blood-pressure in dogs when injected intravenously and slightly increases the systolic blood-pressure in man when given by mouth. Pseudo-ephedrine is dextrorotatory, and is less powerful in pharmacological activity than ephedrine, which is levorotatory.

The Control of Kala-Azar on Tea Estates (L. E. Napier and P. Foster, *Indian Medical Gazette*, February, 1927).—The conclusions to be drawn from the experience in the gardens of Dooria and Hautley (Assam) are that by segregation and treatment alone the spread of the disease in an estate will not be stopped, but that by these measures it can be controlled, especially if they are adapted early; that a lesser degree of success can be expected from treatment alone; and transfer of the lines can be expected completely to cut short an epidemic. It is seldom possible to carry out a complete transfer in less than one year, by which fact the value of this measure is considerably reduced. Furthermore, it is extremely unpopular amongst the coolies and is very expensive. On the other hand, the treatment of the disease is so satisfactory in these days that a 95 per cent. cure rate can be anticipated and the cost even for the more expensive pentavalent compounds can be calculated at about Rs. 5 per patient in a mixed population. Treatment would, of course, be carried out even if the lines were transferred, but it is doubtful if the failure to transfer the lines could lead to more than 200 additional infections per 1,000 of the population; the additional actual cost, Rs. 1,000, for the treatment of these cases would most certainly be much less than the cost of transferring the whole lines. Taking all things into consideration, therefore, the obvious policy to adopt, unless there are independent reasons for the transfer of the lines, is treatment of each case as it occurs. If this is combined with repeated inspection of the coolies and careful observation of all suspicious cases and contacts a considerable degree of success can be anticipated.

On one garden twenty-three families and on another garden sixteen families became infected with kala-azar during the years 1923-1925. All the patients were placed under treatment with urea-stibamine, but no other preventive measures were adopted; in only six instances have second cases occurred in these families.

Review.

Arbeiten aus dem Gebiete der Tropenmedizin Beihefte zum *Archiv für Schiffs- und Tropen-Hygiene*. Vol. 30. No. 1. 1926.

The Supplementary Numbers of the *Archiv für Schiffs- und Tropen-Hygiene* are issued irregularly from time to time as material collects, there having already appeared one number in 1921, one in 1924, whilst five were published in 1925. In the majority of cases these brochures take the form of monographs by recognized authorities, whilst in some cases they contain a collection of articles by various authors. The number under review belongs to the latter class, containing twenty-seven contributions delivered at the session of the German Society of Tropical Medicine, held in Hamburg in October, 1925. Although the papers themselves appear in full, being accompanied by 61 illustrations, five curves and ten tables in the text, the discussions and bibliographical references have been curtailed for want of space. The whole constitutes a compact volume of 240 pages, with a table of contents but no index. Among the contributors one notes such well-known names as Giemsa, Nocht, Stendel, Fülleborn, Muhlens, Ziemann, Winckel, Werner, Fischer, Mürmich, Westphal, and Schilling. The subjects dealt with include malaria and blackwater fever, the morphology of *Anopheles maculipennis*, the pharmacological action of quinine derivatives, antimony preparations, Bayer 205, Yatren 105, and antidysten. The path of infection in ascaris infections and the cutaneous reactions in helminth affections are the contributions dealing with helminthology. Framboesia tropica, five-day fever (febris quintana) and the so-called "rhinopharyngitis mutilans" are also dealt with. Demonstrations of the d'Herelle phenomenon and bacterial flagella are described. Surgery also finds a place in the discussion of malaria and splenectomy, the surgery of echinococci and the surgical complications of typhoid. Geographical pathology includes discussions on the pathology of South America, on medical experiments in Central America, on the medicine of the West Coast of Colombia, and on the influence of race in pathology. This mere enumeration of authors and subject matters indicates the interesting nature of the contents of this volume, which are so varied as to provide something of interest for every taste.

F. E. T.

Colonial Medical Reports.—No. 210.—Saint Lucia (*contd.*).

The highest clinical observers in England, Eric Pritchard and Clive Riviere, Holt in America, stress the difficulties of diagnosis and agree that in too many instances the post-mortem table is the final and impartial court of appeal. Our difficulties in the tropics are enhanced by the predominant rôle which worms and malaria play in the affections of childhood; a series of post-mortems, bacteriological examination of the tissues, examination of the glands by puncture in the living, inoculation of guinea-pigs, rigid clinical pursuance of cases brought the facts to one's mind. This is confirmed by the von Pirquet tuberculin reaction.

Pneumonia.—The clinical features of these cases are peculiar. Of a fulminating type, pneumonia occurs throughout the year, irrespective of season. It is a massive infection of young adults, the viscid, bile-stained sputum teems with tubercle bacilli. It is a massive auto-infection from the breaking down of old foci, or a re-infection in an intensive dose. Thirty-one cases with a mortality of nineteen, 60 per cent.

Pulmonary tuberculosis.—Eight cases ending fatally within the short compass of an average of six months. The victims are usually destitute; the closing, tragic scene, after a respite of a disease contracted in childhood.

Tuberculosis is primarily a disease of the bowel, and the fæces of man and the domesticated animals play the predominant part in the spread of the infection, long before lung symptoms are apparant.

Prophylactic measures are now in the right direction, the prevention of soil pollution by a proper latrine system throughout the district.

Contagious Diseases.—Yaws.—No cases occurred in the village of Dennery; the disease continues endemic in the Mabouya and Mon Repos Districts.

Gonorrhœa.—Thirty-seven cases. Two cases of ophthalmia neonatorum treated with success by the district nurse.

Syphilis.—Primary 4, secondary 29, tertiary 65, total 98. Congenital 27. Total number of injections 108.

Leprosy.—The same case of nodular leprosy mentioned in Report 1924. Under treatment with "moogrol" since September, 1925. Marked improvement in nodules of face and in general health and well-being.

Sanitation and Hygiene.

General Health of the District.—The figures for the years 1923-1925 show a steady decline in the incidence of the prevailing diseases. The highest contributions to the mortality rate come from infants, stillbirths and deaths up to the age of five years. Now that the causal factor, tuberculosis, has been determined, soil pollution of man and the domestic animals, and an intensive campaign undertaken with the resident sub-sanitary inspector for the erection of latrines throughout the district, one is tempted to face the future with confidence provided efforts for bettering conditions are unrelenting.

Mosquito Control.—The village funds are inadequate to keep the canals in ideal condition. Only for one month in the very wet season, when the weeds took mastery, was the anopheles a pest, September to October, and the malarial incidence was high. During visits to estates and peasant proprietors, measures have been enforced to drain stagnant pools and canals, and to keep premises free of bush and refuse. Quinine was supplied to schools and estates as usual for prophylaxis.

Conservancy Services.

(*a*) *Disposal of Excreta.*—A decided advance has been made in that direction. About 200 new privies on the pit system have been built throughout the district. There is room for more; this is a good start in the right direction at last. The ideal service for St. Lucia is incineration. The soil is a shallow, impervious clay resting on conglomerate, easily water-logged. In the rainy season the pits are full of water, their contents flow over the ground, mosquitoes and flies breed freely in them, they constitute a source of danger and infection.

(*b*) *School latrines.*—The schools are amply provided. Dennery and Ressource pail system, Mon Repos pit system; an educative act in the right direction.

(*c*) *Disposal of Refuse and Garbage.*—The peasantry are now encouraged to have dump heaps and not to scatter garbage in the bush about their homes. Dennery Village has dump heaps for the burning of refuse.

Report of the Chief Sanitary Inspector.

No outbreak of infectious disease, in epidemic form, occurred during the year; the operations of the department, as a whole, were therefore confined to established routine work, divided—for the first time—into regularly defined areas which were placed under the supervision of separate sanitary inspectors, each working together with the medical officer of the district, but under the control and direction of the chief sanitary inspector as head of the subordinate staff.

Anti-Malaria Measures.

The anti-malaria measures record a grand total of 28,674 premises and 7,710 water containers inspected during the year. Out of the latter, 863 were found containing larvæ and were summarily dealt with on the spot. No prosecutions for mosquito breeding were lodged by the department during the period under review. The cleaning and channeling of ravines, streams and drains shows a very decided increase in the amount of this class of work done. A very essential piece of work along these lines was the weeding, cleaning, channeling and oiling of the ravine—approximately about 2,640 yards in length—which runs from Morne Road (opposite "Beaver Lodge") down to a point below Toc Huts. This ravine is intersected with numerous pools—some fairly sized—as well

as a goodly number of pockets. All of the larger pools were stocked with "millions" fish. As this place is one of the principal breeding grounds for the mosquitoes, which, at times, infest Government House, it should be regularly weeded and cleaned at least three times a year and regularly oiled in the dry season, once a week; results would fully justify the expenditure and remove the source of an oft-recurring and dangerous nuisance to the inmates of this important residence.

No unusually heavy incidence of malaria was reported from either of the districts during the year, although at Dennery—in the village itself, and in the Mabouya Valley—there occurred a certain number of colds and "fever" during the months of August and September.

Infectious Diseases—Repressive Measures.

The number of cases of infectious diseases dealt with only represent those which have been *officially notified* to this department and, with the exception of typhoid (which is regularly and systematically notified) do not correctly give the total number of all cases of this class of disease which actually occurred in the colony throughout the year 1925.

Although pneumonia and tuberculosis are notifiable, yet only twenty-eight (28) cases of tuberculosis were officially notified for the treatment of the premises, bedding and clothing of the patients. No notification of either of these diseases was received from the Victoria Hospital, although it is reasonable to assume that there must have been admissions to that institution during the period under review. From Districts 4, 5 and 6 no cases of typhoid were reported, although a resident of Soufrière, who was brought to hospital from that place, developed it after being admitted. As usual, District No. 1—the most thickly populated—heads the list with a total of twenty-seven (27) cases of enteric fever. In each instance, thorough disinfection of premises, bedding and clothing of patients, and inoculation of contacts were carried out. The premises of each case of tuberculosis notified, as well as the bedding and clothing of the patient, were similarly treated. Splendid work was done by Inspectors Haynes and Welch in Districts 5 and 3, respectively, in rounding up and convoying to the doctors a number of reluctant—and oft-times very truculent—unfortunates suffering from yaws. The former succeeded in getting in eighty-two (82) cases and the latter forty-one (41) cases, all of which received treatment. Four cases of leprosy were also handled by these two inspectors, between them, at various times.

Disinfection of Baggage.—In every instance where passengers landed here from a place known to have cases of quarantineable infectious diseases—although the place itself was not under quarantine—all of their baggage was disinfected and careful watch kept over the movements of each individual, until the expiration of his or her period of surveillance. In dealing with this precautionary measure, no chances were taken.

Advance Sanitary Campaign.

One of the chief services which each inspector was instructed to intensively tackle, immediately as he took up his assigned district, at the commencement of the year, was the continuation of the "advance work" which had been previously carried along in co-operation with the International Health Board's Hookworm Campaign in the colony—especially in the centres of Choiseul, Vieux-Fort, Micoud and Dennery. The results obtained from Vieux-Fort and Dennery are very creditable, when the distances which the inspectors have to travel, the quality of the tracks through which they have to pass and, above all, the present scarcity of money among the peasantry, are taken into account. But the same cannot be said of Choiseul, which was assigned to an employee who developed chronic inertia and could be neither coaxed nor driven. After repeated admonitions and several chances to make good had been given him, it was found necessary to dispense with his services towards the end of the year. In all one hundred and twenty-eight (128) complaints were lodged against persons who manifested an inclination not to comply with the notices served on them to erect latrines; but, with the exception of eighteen (18)—who were tried and fined by the magistrate—all of them immediately complied on receiving summonses and the complaints were withdrawn.

Colonial Medical Reports.—No. 211.—Mauritius.

ANNUAL REPORT ON THE MEDICAL AND HEALTH DEPARTMENT, JANUARY 1 TO DECEMBER 31, 1925.

VITAL STATISTICS.

Population.

THE area of Mauritius is 720 square miles (460,800 acres) and the estimated population on December 31, 1925, was 393,708.

The density of population is very high, 546·8 per square mile for the whole island. A high density of population *per se* is not necessarily associated with a heavy death-rate, although it commonly carries with it other evils, e.g., increased liability to fouling of the air, the soil and the water, and the easy spread of infectious diseases. The housing accommodation and the conditions of living of a community are of more importance in connection with health than the number of persons living on

a square mile. Unfortunately in Mauritius, and especially in Port Louis, the density of the population occurs amongst the poorer classes where the housing conditions are appalling; and intemperance, bad feeding and the other inevitable conditions of poverty exist.

Births.

The total number of births for the year was 16,545 (8,299 males and 8,246 females, 5,278 in the General and 11,267 in the Indian population), showing an increase of 1,115 over the figure for 1924. The birth-rate was 42·6 per 1,000 against 40·4 in 1924.

Deaths.

During the year 1925, the total number of deaths was 9,327 (4,736 males, 4,591 females; 2,776 in the General and 6,551 in the Indian population) or 1,231 less than in 1924. The death-rate for the colony was 24·1 per 1,000, compared with 27·7 for 1924. The month of maximum mortality was January.

The number of deaths ascribed to malaria and malarial cachexia (highest death-producing factors in Mauritius) is 1,634, against 1,732 in 1924, or a percentage of total deaths of 17·5 in 1925, and 16·4 in 1924. No doubt can be attached to the improvement in the health conditions which these figures denote if it is remembered that in Port Louis no death is registered unless certified by a medical practitioner.

The next high causes of death are pneumonia and broncho-pneumonia, 785 in 1925, against 1,296 in 1924, and diseases of early infancy, 1,090 against 1,075 in 1924.

The more notable causes of death were malaria and malarial cachexia, pneumonia and broncho-pneumonia, influenza, diseases of early infancy, pulmonary tuberculosis, diarrhœa and enteritis, bronchitis, old age, dysentery, albuminuria, Bright's disease, nephritis and uræmia, debility (over one year and under seventy), plague, heart diseases (organic), and the puerperal state.

Deaths due to preventable diseases, i.e., diseases due to faulty sanitary conditions, overcrowding, soil infection, defective or infected water supplies, numbered 3,790 or 40·6 per cent. of total deaths, against 3,906 and 37 per cent. in 1924. Deaths due to infantile diarrhœa and infantile convulsions are not included in this figure.

Infantile Mortality.

Infantile mortality rate is the annual number of deaths of infants under one year for every thousand live births registered during the same year. It is considered as affording the most reliable test of the general sanitary conditions of a district and is therefore a most important index from the public health point of view.

The rate for 1925 was 119·7 per 1,000 as against 129·6 in 1924.

The most important causes of infantile mortality are, as usual, congenital debility, improper dieting, neglect and premature birth. Many children at birth are mere weaklings and are doomed to early death owing to the early marriages amongst Indians and child-bearing at immature age, work of expectant mothers in the fields and the usual hardships and privations in the poorer classes. These causes, *per se*, are sufficient to bring about death during the later months of fœtus or of infants born during later months of gestation. Infantile mortality is in every country usually higher among males than among females, except in the case of whooping cough. The highest mortality in the age period "one year—under five years" occurred as usual in the period "one year—under two years," gradually decreasing.

PREVALENCE OF SICKNESS AND RECURRENCE OF PARTICULAR DISEASES.

Notifiable Contagious and Infectious Diseases.

Ordinance No. 47 of 1898 provided for the compulsory notification of plague, cholera, choleraic diarrhœa, small-pox, yellow fever, diphtheria and membranous croup, measles, scarlatina, or scarlet fever, and the fevers known by any of the following names: typhoid or enteric, typhus, relapsing or continued and puerperal; and traumatic erysipelas and of any other disease that may be added thereto by regulations.

By regulations published under G.N. No. 65 of April 15, 1908, cerebrospinal meningitis has been made notifiable; so also the diseases known as "varicella" or chicken-pox by regulations published under G.N. No. 46 of March 17, 1913, and Spanish influenza by regulations published under G.N. No. 153 of June 11, 1920.

Under Ordinance No. 47 of 1925 (The Public Health Ordinance) which came into force on December 31, 1925, "infectious or contagious disease" means any of the following diseases: Small-pox (including the form known as "amaas" or alastrim and any diseases resembling small-pox, except chicken-pox), scarlatina or scarlet fever, typhus fever, diphtheria or membranous croup, erysipelas, puerperal fever (including septicæmia, pyæmia, septic pelvic cellulitis, or other serious septic condition occurring during the puerperal state), Asiatic cholera, enteric or typhoid fever (including paratyphoid fevers), epidemic cerebrospinal meningitis or cerebrospinal fever, acute poliomyelitis, leprosy, plague, anthrax, glanders, rabies, Malta fever or undulant fever, sleeping sickness or human trypanosomiasis, and any other disease declared by regulations to be an infectious or contagious disease. For notification purposes under that Ordinance, all forms of tuberculosis which are clinically recognizable apart from reaction to the tuberculin test are held to be infectious or contagious diseases.

Notifiable infectious or contagious diseases in 1925 were as follows: typhoid fever 122, puerperal fever and puerperal septicæmia 40, erysipelas 25, diphtheria 68, cerebrospinal meningitis 2, measles 9, and chicken-pox 4. Notification was received in April, 1925, of a case of scarlet fever on board s.s. "Ilford," in Port Louis harbour.

Plague.—That plague is an endemic disease in Mauritius is easily shown by going over the available statistics since 1899, the year when the disease was first detected in the colony. The number of cases in the year 1925 was 74, with 65 deaths.

Plague deaths (registered at the Civil States Offices during the year) represent 0·7 per cent. of total deaths in 1925 against 1·38 per cent. in 1924. It will be seen that the percentage of deaths in 1925 is still high. There is, however, no cause for alarm when it is known that thirty-six of the cases were found post-mortem, while the deaths were being controlled by officers of this department prior to registration. Only thirty-eight cases, therefore, probably received adequate treatment, of which four were *in extremis* when notification reached this department. Of the thirty-four remaining cases, nine recovered, giving as percentage of deaths 73·5 on the cases notified before death and before being *in extremis*.

Treatment of Plague.—The methods of treatment employed vary according to the type of case. They may be classed as: Specific, i.e., treatment by the intravenous administration of anti-plague serum, and general: the administration of stimulants and other appropriate remedies, e.g., electrargol.

On the suggestion of Dr. A. Balfour, mercurochrome, 220 soluble, has been received. Neokharsivan, which, tried by the Senior Medical Officer, Uganda, and the Assistant Surgeon, is stated to have given most striking results, has also been received. No suitable opportunity occurred, however, during the year under review for the administration of either preparation. Only six cases were treated at the Grand River North West lazaret, all of which were not considered suitable for treatment by mercurochrome or neokharsivan.

Four thousand nine hundred and eighty-eight persons were inoculated with anti-plague vaccine in Port Louis and 454 in Plaines Wilhems.

Fifty-four cats were found dead or killed in Port Louis; only fifteen of them could be examined, and two were found plague infected. The cost of the rat campaign for 1925 works out at 43 cents per rat caught.

Plague is usually virulent in Mauritius in the period extending from the end of August (with its maximum in November-December) to January-February. The incidence of plague in January and February, 1925, was but the termination of the epidemic of August, 1924. The other cases which occurred during the year under review were only sporadic—viz., one case in April, four cases in May, one in August, one in September, seven in October, two in November and eleven in December. No case has been detected during the year 1926 up to the date of this report, viz., April, 1926. 65 per cent. of the cases registered occurred in Port Louis. In Plaines Wilhems, where, from September, 1924, the disease had shown a tendency to spread, the epidemic died out in February, 1925. The three cases detected occurred in the contaminated area of Quatre Bornes, viz., Trianon Estate Belle Rose. Only one other case (pneumonic plague) occurred in that district in May, 1925, at Curepipe Road, coming from "Le Mesnil" (Phœnix). Four other districts were visited by plague in 1925, viz., Pamplemousses, Revière du Rempart, Flacq and Moka. In Pamplemousses, fifteen cases occurred in all; ten in January-February, two in April-May, and three in October-November. The January-February cases all occurred on Grande Rosalie Sugar Estate and were treated at the Estate hospital. Four cases recovered. The April-May cases came from the Mount Sugar Estate.

The first case (bubonic plague) was detected at the Civil Hospital, where the patient had been admitted, and the other (septicæmic plague) was seen post-mortem on the estate. Of the three cases which occurred in October-November, two registered in October were detected post-mortem. They occurred at Plaine des Papayes hamlet, in the northern part of the district of Pamplemousses. The third case (bubonic plague) occurred in November, on Petite Rosalie Estate, and an annexe of the Mount Sugar Estate. The case was treated at the hospital of the latter estate and recovered. Petite Rosalie, Grande Rosalie and the Mount Sugar Estates being contiguous, the spread of the disease from one estate to the other is easily explained. In Rivière du Rempart, the outbreak was confined to the hamlet of Goodlands. The first case was detected on September 21. It was septicæmic plague and was seen post-mortem. The second case was also septicæmic plague and seen post-mortem. The third case (bubonic plague), a contact of the second, had already developed plague on detection of the second case. It ended fatally at Poudre d'Or Hospital, where it had been removed for treatment. In the district of Flacq a single case was detected in 1925. It occurred in January, in Grande Retraite hamlet, where plague first broke out in December, 1924, causing four deaths out of five cases detected. In Moka, one case occurred in January and two in December. The first case, from Providence, was diagnosed at Moka Hospital, where the patient was under treatment. The case ended fatally at Grand River North West Lazaret, where it was removed for segregation and treatment. The two cases detected in December occurred at Nouvelle Découverte. The first was septicæmic plague. It was detected post-mortem. The second (bubonic plague) was removed to Long Mountain Hospital, where it ended fatally. Rodent plague, the forerunner of human plague, was detected in Port Louis in 1925.

No plague rat has been caught in Port Louis in 1926, up to the date of this report. Special plague measures were taken in the infected localities in country districts, notably in Plaine des Papayes and Goodlands hamlets. They largely helped to circumscribe the disease and it may be said that a certain amount of success has repaid the efforts of this department.

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(*Proceedings of the Royal Society of Medicine, Section of Therapeutics & Pharmacology, Jan.* 1920.)

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